



## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2021-0577; Project Identifier AD-2021-00470-E; Amendment 39-21787; AD 2021-22-14]**

**RIN 2120-AA64**

#### **Airworthiness Directives; Pratt & Whitney Division Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** The FAA is superseding Airworthiness Directive (AD) 2021-05-16 for certain Pratt & Whitney Division (PW) PW4164, PW4164-1D, PW4168, PW4168-1D, PW4168A, PW4168A-1D, and PW4170 model turbofan engines. AD 2021-05-16 required initial and repetitive replacements of the low-pressure turbine (LPT) 4th-stage air sealing ring segment assemblies with parts eligible for installation. AD 2021-05-16 also required initial and repetitive dimensional inspections of the LPT case for bulging and, depending on the results of the dimensional inspections, repair or replacement of the LPT case. This AD was prompted by notification to the FAA of an inadvertent omission in the LPT 4th-stage air sealing ring segment assembly part numbers. This AD requires initial and repetitive replacements of the LPT 4th-stage air sealing ring segment assemblies with parts eligible for installation. This AD also requires initial and repetitive dimensional inspections of the LPT case for bulging and, depending on the results of the dimensional inspections, repair or replacement of the LPT case. The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain other publication listed in this AD as of May 7, 2021 (86 FR 17287, April 2, 2021).

**ADDRESSES:** For service information identified in this final rule, contact Pratt &

Whitney Division, 400 Main Street, East Hartford, CT 06118; phone: (800) 565-0140; email: [help24@pw.utc.com](mailto:help24@pw.utc.com); website: <https://fleetcare.prattwhitney.com>. You may view this service information at the Airworthiness Products Section, Operational Safety Branch, FAA, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0577.

### **Examining the AD Docket**

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0577; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Carol Nguyen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7655; fax: (781) 238-7199; email: [carol.nguyen@faa.gov](mailto:carol.nguyen@faa.gov).

### **SUPPLEMENTARY INFORMATION:**

#### **Background**

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to supersede AD 2021-05-16, Amendment 39-21459 (86 FR 17287, April 2, 2021), (AD 2021-05-16). AD 2021-05-16 applied to certain PW PW4164, PW4164-1D, PW4168, PW4168-1D, PW4168A, PW4168A-1D, and PW4170 model turbofan engines with LPT 4th-stage air sealing ring segment assemblies, part number (P/N) 50N463-01 or P/N 50N526-01, installed. The NPRM published in the *Federal Register* on July 23, 2021 (86 FR 38941). The NPRM was prompted by notification from a manufacturer of parts manufacturer approval (PMA) parts that AD 2021-05-16 should include affected PMA part numbers because the unsafe condition also applies to those parts. AD 2021-05-16 resulted from six reports from the manufacturer concerning LPT 4th-stage vane cluster assemblies leaning back and notching into rotating LPT 4th-stage blades, causing some

blades to fracture and release. These incidents resulted in an aborted takeoff, air turnbacks, engine surges, high vibrations, and unplanned engine removals. The incidents were attributed to the LPT 4th-stage air sealing ring segment assemblies moving into the LPT 4th-stage blades knife edge seals, resulting in damage to the ring segment assemblies. In the NPRM, the FAA proposed to require initial and repetitive replacements of the LPT 4th-stage air sealing ring segment assemblies with parts eligible for installation. In the NPRM, the FAA also proposed to require initial and repetitive dimensional inspections of the LPT case for bulging and, depending on the results of the dimensional inspections, repair or replacement of the LPT case.

### **Discussion of Final Airworthiness Directive**

#### **Comments**

The FAA received comments from one commenter, the Air Line Pilots Association (ALPA). ALPA supported the NPRM without change.

#### **Conclusion**

The FAA reviewed the relevant data, considered the comments received, and determined that air safety requires adopting the AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. This AD is adopted as proposed in the NPRM.

#### **Related Service Information under 1 CFR Part 51**

The FAA reviewed Pratt & Whitney Alert Service Bulletin No. PW4G-100-A72-262, Revision No. 1, dated September 3, 2020 (the ASB). The ASB specifies procedures for replacing the LPT 4th-stage air sealing ring segment assemblies and inspecting the LPT case for bulging. The Director of the Federal Register approved the ASB for incorporation by reference as of May 7, 2021 (86 FR 17287, April 2, 2021). This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

#### **Costs of Compliance**

The FAA estimates that this AD affects 99 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

### Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
Inspect the LPT case for bulging	2 work-hours x \$85 per hour = \$170	\$0	\$170	\$16,830
Replace the LPT 4th-stage air sealing ring segment assemblies	50 work-hours x \$85 per hour = \$4,250	\$64,592	\$68,842	\$6,815,358

The FAA estimates the following costs to do any necessary repair or replacement that would be required based on the results of the inspection. The agency has no way of determining the number of aircraft that might need these repairs or replacements.

### On-condition costs

Action	Labor Cost	Parts Cost	Cost per product
Repair LPT case to restore dimensions	250 work-hours x \$85 per hour = \$21,250	\$0	\$21,250
Replace the LPT case	0 work-hours x \$85 per hour = \$0	\$1,300,000	\$1,300,000

### Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

## **Regulatory Findings**

The FAA has determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and
- (3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

## **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

## **The Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

- 2. The FAA amends § 39.13 by:

- a. Removing Airworthiness Directive 2021-05-16, Amendment 39-21459 (86 FR 17287, April 2, 2021); and

- b. Adding the following new airworthiness directive:

**2021-22-14 Pratt & Whitney Division:** Amendment 39-21787; Docket No. FAA-2021-0577; Project Identifier AD-2021-00470-E.

#### **(a) Effective Date**

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**(b) Affected ADs**

This AD replaces AD 2021-05-16, Amendment 39-21459 (86 FR 17287, April 2, 2021).

**(c) Applicability**

This AD applies to Pratt & Whitney Division (PW) PW4164, PW4164-1D, PW4168, PW4168-1D, PW4168A, PW4168A-1D, and PW4170 model turbofan engines with low-pressure turbine (LPT) 4th-stage air sealing ring segment assemblies, part number (P/N) 50N463-01, P/N 50N526-01, or FAA-approved equivalent part numbers, installed.

**(d) Subject**

Joint Aircraft System Component (JASC) Code 7250, Turbine Section.

**(e) Unsafe Condition**

This AD was prompted by several reports from the manufacturer concerning LPT 4th-stage vane cluster assemblies leaning back and notching into the rotating LPT 4th-stage blades, causing some blades to fracture and release. A manufacturer investigation into those reports determined that the leaning back of the LPT 4th-stage vane cluster assemblies was caused by damage to the LPT 4th-stage air sealing ring segment assemblies. The FAA is issuing this AD to prevent damage to the LPT 4th-stage air sealing ring segment assemblies, the LPT case, and the LPT 4th-stage blades. The unsafe condition, if not addressed, could result in uncontained release of the LPT 4th-stage blades, damage to the engine, and damage to the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Required Actions**

(1) For affected engines that have either the Talon IIA outer combustion chamber assembly, P/N 51J100 or P/N 51J382, or the Talon IIB outer combustion chamber assembly, P/N 51J381 or P/N 51J500, installed, at the next engine shop visit after the effective date of this AD, remove from service the LPT 4th-stage air sealing ring segment assemblies, P/N 50N463-01, P/N 50N526-01, or FAA-approved equivalent part numbers, and replace with parts eligible for installation.

(2) For affected engines not referenced in paragraph (g)(1) of this AD, at the next LPT overhaul after the effective date of this AD, remove from service the LPT 4th-stage air sealing ring segment assemblies, P/N 50N463-01, P/N 50N526-01, or FAA-approved equivalent part numbers, and replace with parts eligible for installation.

(3) For all affected engines, at each LPT overhaul after compliance with the required actions in paragraph (g)(1) or (2) of this AD, remove from service the LPT 4th-stage air sealing ring segment assemblies, P/N 50N526-01 or FAA-approved equivalent part numbers, and replace with parts eligible for installation.

(4) During each replacement of the LPT 4th-stage air sealing ring segment assemblies required by paragraphs (g)(1) through (3) of this AD, perform a dimensional inspection of the LPT case for bulging in accordance with the Accomplishment Instructions, paragraph 2, of PW Alert Service Bulletin No. PW4G-100-A72-262 Revision No. 1, dated September 3, 2020 (the ASB).

(5) If, during the dimensional inspection of the LPT case required by paragraph (g)(4) of this AD, any LPT case found to be outside the serviceable limits specified in Table 1: Serviceable Limits and Repairs of the ASB, repair or replace the LPT case before further flight.

#### **(h) Definitions**

For the purpose of this AD:

(1) An “engine shop visit” is the induction of an engine into the shop for maintenance involving the separation of pairs of major mating engine flanges H through P. The separation of engine flanges solely for the purpose of transportation without subsequent engine maintenance does not constitute an engine shop visit.

(2) An “LPT overhaul” is when the LPT rotor is removed from the engine, all four disks are removed from the LPT rotor, and all blades are removed from the disks.

(3) “Parts eligible for installation” are LPT 4th-stage air sealing ring segment assemblies, P/N 50N526-01, or FAA-approved equivalent part numbers, with zero flight cycles since new or with a P/N not mentioned in this AD.

**(i) Credit for Previous Actions**

You may take credit for the dimensional inspection of the LPT case for bulging required by paragraph (g)(4) of this AD if the inspection was performed before the effective date of this AD using PW ASB PW4G-100-A72-262 Original Issue, dated October 22, 2019.

**(j) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (k) of this AD. Information may be emailed to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

**(k) Related Information**

For more information about this AD, contact Carol Nguyen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7655; fax: (781) 238-7199; email: carol.nguyen@faa.gov.

**(l) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(3) The following service information was approved for IBR on May 7, 2021 (86 FR 17287, April 2, 2021).

(i) Pratt & Whitney Alert Service Bulletin No. PW4G-100-A72-262, Revision No. 1, dated September 3, 2020.

(ii) [Reserved]

(4) For Pratt & Whitney service information identified in this AD, contact Pratt & Whitney, 400 Main Street, East Hartford, CT 06118; phone: (800) 565-0140; email: [help24@pw.utc.com](mailto:help24@pw.utc.com); website: <https://fleetcare.prattwhitney.com>.

(5) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759.

(6) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov), or go to: <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on October 15, 2021.

Lance T. Gant, Director,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.

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